

TITLE OF THE INVENTION

IMAGE DOWN-LOADING APPARATUS AND SYSTEM, AND IMAGE DOWN-  
LOADING METHOD

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BACKGROUND OF THE INVENTION

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The present invention relates to an image down-  
loading apparatus and system, and image down-loading  
10 method for down-loading a moving image, such as a live  
image, to a terminal or terminals connected to a  
computer network via the computer network.

Conventionally, an image down-loading system for  
providing a live image to unspecified or specified  
15 viewers (computers) via computer networks, such as an  
intranet and the Internet is known. For example, a live  
image may be down-loaded as it is embedded in a home  
page or as a part of a home page of the world wide web  
(WWW), and the down-loaded image is displayed on a  
20 display screen of a client device.

Consider a common computer network as shown in Fig.  
9; an Internet terminal 10 accesses a WWW server 14 via  
the Internet 12, further accesses a video camera 16  
linked to a home page of the WWW server 14, and requests  
25 an image sensed by the camera 16. The image sensed by  
the camera 16 is displayed in a browser of the terminal

10 using a plug-in, a helper-application, or a server-push technique.

It is advantageous for an image-providing-party to display advertisement of the party together with the  
5 live image as shown in Fig. 10A; however, it is possible for the terminal 10 to obtain only the image sensed by the camera 16. Moreover, it is possible to display advertisement of a third party instead of the original advertisement along with the image as shown in Fig. 10B.  
10 In other words, there is a fear that the image sensed by the camera 16 is plagiarized.

#### SUMMARY OF THE INVENTION

15 The present invention has been made in consideration of the above situation, and has as its object to provide an image down-loading apparatus and system, and image down-loading method capable of preventing a moving image, such as a live image, from  
20 being plagiarized.

According to the present invention, the foregoing object is attained by providing an image down-loading apparatus capable of down-loading an image to a plurality of clients via a network, comprising: first  
25 output means for outputting an image; second output means for outputting information which is independent of

the image outputted by the first output means; a switch for switching between the first output means and the second output means; and a switch controller for controlling the switch, wherein the switch controller  
5 controls the switch so as to select the second output means for a first predetermined period after the first output means is selected for a second predetermined period.

Further, the foregoing object is also attained by  
10 providing an image down-loading system capable of down-loading an image to a plurality of clients via a network, comprising: first down-loading means for down-loading an image; second down-loading means for down-loading information which is independent of the image down-  
15 loaded by the first down-loading means; a switch for switching between the first down-loading means and the second down-loading means; and a switch controller for controlling the switch, wherein the switch controller controls the switch so as to select the second down-  
20 loading means for a first predetermined period after the first down-loading means is selected for a second predetermined period.

Furthermore, the foregoing object is also attained by providing an image down-loading method capable of  
25 down-loading an image to a plurality of clients via a network, comprising: a first down-loading step of down-

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loading an image; a second down-loading step of down-loading information which is independent of the image down-loaded in the first down-loading step; a first switching step of switching from the first down-loading  
5 step to the second down-loading step after a first predetermined period has elapsed; and a second switching step of switching from the second down-loading step to the first down-loading step after a second predetermined period has elapsed.

10 Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification,  
20 illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Fig. 1 is a drawing showing a brief configuration of an image down-loading system according to a first  
25 embodiment of the present invention;

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Fig. 2 is a block diagram illustrating a configuration of an image down-loading system according to the first embodiment of the present invention;

Fig. 3 shows an example of an image displayed on a display screen of a client device having authorization to control camera;

Fig. 4 shows an example of a display screen of the client device when advertisement is displayed;

Fig. 5 is a flowchart for explaining an operation of a web server according to the first embodiment of the present invention;

Fig. 6 is a flowchart for explaining another operation of the web server according to the first embodiment of the present invention;

Fig. 7 is a flowchart for explaining an operation of a web server according to a second embodiment of the present invention;

Fig. 8 is a flowchart for explaining another operation of the web server according to the second embodiment of the present invention;

Fig. 9 is a schematic view showing a configuration of the conventional image down-loading system; and

Figs. 10A and 10B are examples of images conventionally displayed on a display screen.

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#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will be described in detail in accordance with the accompanying drawings.

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<First Embodiment>

Fig. 1 is a schematic view showing a brief configuration of an image down-loading system according to a first embodiment of the present invention. In Fig. 10 1, reference numeral 20 denotes a camera for sensing an object; 22, an image server for transmitting image information, such as advertisement; 24, a switch for switching between an output from the camera 20 and an output from the image server 22; 26, a web server; 28, a 15 network; and 30, an Internet terminal (e.g., personal computer).

The Internet terminal 30 accesses a home page of the web server 26 via the network 28 and selecting the camera 20 in the home page. With the foregoing operation, 20 the terminal 30 requests the web server 26 to send an image sensed by the camera 20 and receives the image. This operation is the same as the conventional operation; however, in the first embodiment, the switch 24 switches from the image outputted from the camera 20 25 to information from the image server 22 for a predetermined period at predetermined intervals. For

instance, the switch 24 selects an image from the camera 20 for 55 seconds, then selects image information from the image server 22 for the next 5 seconds while transmitting the images over the network 28.

5       Next, an operation of the web server 26 will be explained with reference to a flowchart shown in Fig. 5.

*Ins. a7*  
10       First in step S10, the web server 26 waits a request for an image from the terminal 30. When an image is requested, the web server 26 controls the switch 24 to select the output from the camera 20 to start providing an image sensed by the camera 20 as well as resets and starts an internal timer in step S11. Then in step S12, the web server 26 waits until a predetermined period (in the above example, 55 seconds) elapses while  
15       down-loading the image. After the predetermined period elapses, then in step S13, the web server 26 controls the switch 24 to select the output from the image server 22 to start down-loading information stored in the image server 22, as well as resets and starts the internal  
20       timer. In step S14, the web server 26 waits until a predetermined period (in the above example, 5 seconds) elapses while down-loading the information, and after the predetermined period elapses, the process proceeds to step S15. In step S15, whether or not the  
25       communication is disconnected is determined, and if yes,

the process is completed; whereas if not, the process returns to step S11 and steps S11 to S15 are repeated.

Information provided from the image server 22 may be advertisement, for instance. The content of the information transmitted from the image server 22 may be changed for each transmission, e.g., every 1 minute in the above example. It is also possible for the image server 22 to store an image sensed by the camera 20 and transmitted via the switch 24.

Further, it is possible to make advertisement, down-loaded from the image server 22 at the first opportunity in the communication, be stored in the terminal 30, and subsequently, to control the terminal 30 to display the advertisement stored in the terminal 30 while the information from the image server 22 is to be down-loaded. In this manner, it is possible to reduce a traffic of the network 28.

Ans. a27 It takes several seconds from the terminal 30 accesses of the camera 20 (and the image server 22) until the first image is provided. Accordingly, it is possible to cause the terminal 30 to display advertisement down-loaded in the last communication ~~during this period.~~

A user capable of using the Internet, for free or at a very low charge, tends to be connected or maintain transmission traffic. This often results in an



unnecessary increase in traffic and additional load on a server. To cope with the problem, there is a method of disconnecting the connection or releasing the transmission traffic after a predetermined period has elapsed. In this case, it is also possible to cause the terminal 30 to display the advertisement down-loaded in the last communication after the disconnection.

Fig. 2 is a block diagram illustrating a configuration of an image down-loading system according to the first embodiment of the present invention. In Fig. 2, reference numeral 40 denotes a camera server; and 42a, 42b, and 42c, client devices (simply referred to as "client" hereinafter) capable of remote-controlling the camera server 40 via a network 44.

15 *Ans. 27* The camera server 40 has a CPU 46, main memory 48, secondary storage device 50, a network interface 52, a video camera 54, a camera controller 56 for controlling the camera 54, a timer 58, and a video capture 60 for capturing an image signal outputted from the video camera 46. The camera controller 56 control the image sensing direction (i.e., panning and tilting) and magnification ratio (i.e., zooming) of the camera 54. The secondary storage device 50 stores a control program executed by the CPU 46, image information of advertisement which is inserted between images sensed by the camera 54, and so on. Namely, the secondary storage

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device 50 corresponds to the image server 22 in Fig. 1. The CPU 46 switches between an image sensed by the camera 54 and an image of advertisement stored in the secondary storage device 50 at predetermined intervals  
5 by referring to the timer 58. Namely, the CPU 46 functions as the switch 24 in Fig. 1.

The video capture 60 receives a signal conforming to the NTSC (National Television System Committee) standard from the camera 54, performs analog/digital  
10 conversion on the signal, compresses the signal, then provides it to the network interface 52. As for the image compression method, there are motion JPEG (Joint Photographic Experts Group), and MPEG (Moving Picture Image Coding Experts Group) methods; however, the method  
15 is not limited to these in the present invention.

The CPU 46 of the camera server 40 captures an image signal outputted from the camera 54 using the video capture 60, and down-loads it to the client 42a, 42b, or 42c, which requested the image, via the network  
20 44. Further, when the CPU 46 accepts a camera control command from the client 42a, 42b, or 42c authorized to control the camera 54 (camera control authorization), it controls the camera 54 using the camera controller 56.

*Inv. 247* In Fig. 2, an internal configuration of the client  
25 42a is shown, and the clients 42b and 42c have the same configuration as the client 42a. More specifically, each

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of the clients 42a, 42b, and 42c has a CPU 62, main  
memory 64, a secondary storage device 66, a bitmap  
display 68, an input device 70, such as a keyboard and  
mouse, and a network interface 72. The clients 42a, 42b,  
5 and 42c respectively request the camera server 40 to  
transmit an image, receive compressed image data,  
expands the compressed image data, and displays the  
image on the bitmap display 68.

Further, when any of the clients 42a, 42b, and 42c  
10 outputs a request for camera control authorization to  
the camera server 40, and receives the authorization, it  
is possible for the authorized client to remote-control  
the camera 54. Note that the camera control  
authorization is administrated so that only one client  
15 42a, 42b, or 42c can have the authorization at a time.  
On the display screen of the client 42a, 42b, or 42c  
which obtained the camera control authorization, control  
buttons 74 for controlling panning, tilting, and zooming  
of the camera 54 are displayed along with an image, as  
20 shown in Fig. 3. The client 42a, 42b, or 42c having the  
camera control authorization can remote-control the  
camera 54 by operating the buttons 74.

sum. 257 According to the first embodiment as described  
above, advertisement is displayed between images sensed  
25 by the camera 54 at predetermined intervals. In such a  
case, the period of the advertisement may be too long or

too short depending upon a user. Accordingly, it is preferable to configure the system so that the period for down-loading the advertisement is set long in default, and the user can switch to an image sensed by the camera 54 after the advertisement is down-loaded, after a predetermined period. To realize this configuration, a switch button 76 is provided along with advertisement image, as shown in Fig. 4. The switch button 76 is activated after a predetermined time has elapsed since the advertisement started displayed. When the user operates the activated switch button 76, the client 42a, 42b, or 42c outputs a request to the camera server 40 to transmit an image sensed by the camera 54. In response to the request, the camera server 40 down-loads an image sensed by the camera 54 via the network 44 instead of the advertisement stored in the secondary storage device 50.

*Im. 267* Fig. 6 is a flowchart showing a processing sequence of the aforesaid operation performed by the web server 26 (or the camera server 40). Note, in Fig. 6, the same processes as those in Fig. 5 are referred to by the same step numbers, and explanations of those are omitted. Fig. 6 differs from Fig. 5 in the processes subsequent to step S13 in which information (e.g., advertisement) from the image server 22 starts down-loaded.

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In step S13, the down-loading of advertisement starts and the timer 40 is reset and started, then the process proceeds to step S21. In step S21, whether or not a predetermined period has passed is determined, and  
5 after the predetermined period has elapsed, the process proceeds to step S22. In step S22, whether a request, designated by operating the switch button 76, for an image sensed by the camera 20 from the terminal 30 (client 42a, 42b, or 42c) is received or not is  
10 determined. If yes, then the process returns to step S11, and the image sensed by the camera 20 starts to down-load to the terminal 30.

Whereas, if no request is received in step S22, then the process proceeds to step S14 and whether or not  
15 a predetermined period has elapsed or not is determined. Note that, since the predetermined period to be determined in step S14 includes the predetermined period determined in step S21, the period to be determined in step S14 is longer than the period determined in step  
20 S21. If the predetermined period has not elapsed, the process returns to step S22, and the process of checking whether or not a request for down-loading the image sensed by the camera 20 is received is repeated until the predetermined period elapses.

25 After the predetermined period has passed in step S14, then the process proceeds to step S15, and if the

communication line is disconnected, the process is completed, whereas if still connected, then steps S11 to S15 are repeated.

5 Note, when a plurality of terminals, e.g., the clients 42a, 42b, and 42c, access the web server 26 (camera server 40), they usually access the server 26 (40) at different times. Therefore, in a case of downloading an image sensed by the camera 20 while inserting advertisement in the aforesaid manner, the switching  
10 between the camera image and the advertisement is performed at different times, since the time when the camera server 40 starts down-loading the image from the camera 20 differs from one client to another.

15 In the first embodiment as described above, an image sensed by the camera 20 and information, such as advertisement, from the image server 22 are alternatively down-loaded; however, the present invention is not limited to this. For instance, it is possible to provide a recorded moving image by reading  
20 out the image instead of a live image, and an image or information, such as characters, which is independent of the moving image may be inserted instead of advertisement while providing the moving image. In short, information which is independent of a moving image is  
25 inserted into the moving image so that the moving image can not be plagiarized.

According to the embodiment as described above,  
since information other than a moving image, such as a  
live image, is inserted into the moving image while  
down-loading the moving image; therefore, it is possible  
5 to prevent the moving image from being plagiarized.

<Second Embodiment>

The second embodiment is described below.

An image down-loading system according to the  
10 second embodiment is the same as that described in the  
first embodiment with reference to Figs. 1 and 2; thus  
explanation of it is omitted.

In the first embodiment, an image sensed by the  
camera 20 and information, such as advertisement, from  
15 the image server 22 are alternately down-loaded at  
predetermined intervals. However, there is a case where  
a client which belongs to the same party providing the  
image sensed by the camera 20 requests the image, for  
instance, and in such a case, it is not necessary to  
20 down-load the advertisement.

Accordingly, in the second embodiment, the camera  
server 40 (web server 26) registers information (e.g.,  
client ID) of a client or clients to which an image  
sensed by the camera 54 (20) should be provided while  
25 inserting advertisement for a shorter period, comparing  
to the first embodiment, or without advertisement, in

the main memory 48 or the secondary storage device 50 and makes a list of the registered clients, and alters the period to down-load the advertisement depending upon the client.

5       An operation of the camera server 40, or the web server 26, according to the second embodiment is explained with reference to a flowchart in Fig. 7. In the following explanation, an image sensed by the camera 54, or 20, is referred to as "image", and information  
10       provided from the image server 22 is referred to as "advertisement".

First, the camera server 40 waits for a request for an image from a client in step S30. When a request is received, the process proceeds to step S31 and the  
15       camera server 40 checks the client ID of the client requesting the image, and determines whether or not the client ID is on the list or not. If the client ID is on the list (YES in step S31), then the process proceeds to step S32 and the period for down-loading an image is set  
20       to t1, further, in step S34, the period for transferring advertisement is set to t3. If the client ID is not on the list (NO in step S31), then the process proceeds to step S33 and the period for transferring an image is set to t2, further, in step S35, the period for transferring  
25       advertisement is set to t4. Here, t3 is set shorter than t4, thereby it is possible to shorten the period for



down-loading the advertisement if the client ID is on  
the list. Note, the periods t1 and t2 may be set to the  
same, or the period t1 may be set longer than the period  
t2. In the latter case, it is possible to down-load the  
5 image for a longer period to the registered client than  
to the non-registered client.

In the flowchart in Fig. 7, a method for shortening  
the period for down-loading advertisement to a  
registered client is described; however, as shown in Fig.  
10 8, it is possible to control to down-load only an image  
to the registered client in the loop of steps S41 and  
S42, and to perform the processes subsequent to steps  
S11 if the client is not registered. Note, the steps S11  
to S15 are the same as those explained with reference to  
15 Fig. 5; therefore, explanation of them are omitted.

To register a client ID in the camera server 40, a  
client sends a request for registration to the camera  
server 40, and the camera server 40 registers the client  
ID in response to the request. The camera server 40 may  
20 determine whether to permit the registration of the  
client or not in accordance with a predetermined rule or  
rules, and register the client ID when the camera server  
40 permits the registration. In this case, it is  
possible to control the registration of a client or  
25 clients connected to a predetermined network, or use a  
password, for instance.



shorten or even eliminate the period for down-loading the information inserted into the moving image when down-loading the moving image to a registered client.

As described above with reference to Fig. 2, the object of the present invention can be achieved by providing a storage medium storing program codes for performing the aforesaid processes to a computer system or apparatus (e.g., a personal computer), reading the program codes, by a CPU or MPU of the computer system or apparatus, from the storage medium, then executing the program.

In this case, the program codes read from the storage medium realize the functions according to the embodiments, and the storage medium storing the program codes constitutes the invention.

Further, the storage medium, such as a floppy disk, a hard disk, an optical disk, a magneto-optical disk, CD-ROM, CD-R, a magnetic tape, a non-volatile type memory card, and ROM can be used for providing the program codes.

Furthermore, besides aforesaid functions according to the above embodiments are realized by executing the program codes which are read by a computer, the present invention includes a case where an OS (operating system) or the like working on the computer performs a part or entire processes in accordance with designations of the

program codes and realizes functions according to the above embodiments.

Furthermore, the present invention also includes a case where, after the program codes read from the storage medium are written in a function expansion card which is inserted into the computer or in memory provided in a function expansion unit which is connected to the computer, CPU or the like contained in the function expansion card or unit performs a part or entire process in accordance with designations of the program codes and realizes functions of the above embodiments.

In a case where the present invention is applied to the aforesaid storage medium, the storage medium stores program codes corresponding to the flowcharts described in the embodiments.

The present invention is not limited to the above embodiments and various changes and modifications can be made within the spirit and scope of the present invention. Therefore to apprise the public of the scope of the present invention, the following claims are made.